

Series and Parallel Circuits Basics

Name: _____

Directions:

1. Log on to your computer
2. Go to the following website:
<http://phet.colorado.edu/index.php>
3. Click the button that says "Play with sims..."
4. Click on the application that says Circuit Construction Kit (DC only). It should be the first box.
5. Click "Run now."

You now have the raw material to create a circuit. Take a moment to look over the site and find all the different materials. To build a circuit you will need several wires, a light bulb, a voltage source, a voltmeter, and a non – contact ammeter. Play with it to see how to grab and manipulate these tools.

Click the reset button.

A. Series Circuits

Build a simple series circuit that consists of 6 pieces of wire, 1 light bulb, and 1 battery (voltage source). In order to complete the circuit, the red circles at the end of each must overlap. Please note that the light bulb also has TWO circles. Your circuit is complete and working when the light comes on and the blue dots begin moving.

Draw a picture of your circuit here.

What do you think that the moving blue dots represent?

Use the tools at the side to get a voltmeter and a Non-contact ammeter. Put the voltmeter near the battery and place the red tab at one end and the black at the other.

What is the voltage? _____

Place the ammeter crosshairs over the moving blue dots. What is the reading? _____

What does this tell us about the circuit?

Use the left button to play with the resistance and voltage of the battery. Make observations on how this changes the readings on the voltmeter and ammeter. Record your observations below. Be sure to record the changes you made and then the effects.

Click the advanced tab and alter the resistivity of the wire. Record your observations.

Raise your hand and let your teacher check off your working series circuit.
Click the reset button to begin working on a parallel circuit.

B. Parallel Circuits

Parallel circuits provide more than one path for electrons to move. Sketch below a parallel circuit that includes 10 wires, 2 light bulbs and 1 voltage source.

Create this using the simulator tool. The blue dots will be moving and both lights will be on once the circuit is complete. Raise your hand so that your teacher can check off your parallel circuit.

Use the voltmeter and non-contact ammeter to measure electron flow and push.

Voltage:_____ Ammeter:_____

How does this compare with your observations in the series circuit? Is this surprising? WHY or WHY NOT?

Alter resistance and voltage and record your observations below.

Now right click on one of the wires connected to a light bulb. Remove the wire and record your observations.

Does this affect the voltage, amperes, or visually change the appearance of the light bulb?

Replace the wire. Now remove one of the wires touching the voltage source. What happened?

What is the difference between removing the first wire and the second? Why is this significant?

C. Comparisons

Create a second series circuit and record your observations about the two once they are side by side.

You may use the tool to play around. Create a circuit using a switch. Diagram your circuit below and show your working circuit to the teacher to receive extra credit points.

Record any observations below.